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3. The position of the nitro group in the phenyl radical of a mixed ester of monothiophosphoric acid is of great importance. Of the three isomers in the table, the greatest toxicity is exhibited by diethyl-4-nitrophenylthiophosphate and the least by diethyl-3-nitrophenylthiophosphate.

4. Dialkyl-nitrophenylthiophosphates are more active than monoalkyldinitrodiphenylthiophosphates and trialkylthiophosphates.

5. Trinitrotriphenylthiophosphate is almost completely inactive.

6. Several of the phosphoric esters are very active, and many of them are more active than DDT and GKhtsC.

In pointing to the value of phosphoric acid esters both as (1) ordinary insecticides and (2) in the internal therapy of plants, attention is called in the first instance to page 18 of Theses of the 19th Plenum of the Section of Plant Care, by Mel'nikov and Popov, published by the All-Union Academy of Agricultural Sciences imeni Lenin, Stalinabad, 1949, and, in the second case, to an article by H. Coates in Ann. App. Biol., Vol XXXVI, page 156, 1949.

TABLE 1

Name, Formula	Boiling Point (in deg C)	Yield (in %)
Methyl-4,4'-dinitrodiphenylthiophosphate $\text{CH}_3\text{OPS}(\text{OC}_6\text{H}_4\text{NO}_2)_2$	145-147	51
Ethyl-4,4'-dinitrodiphenylthiophosphate $\text{C}_2\text{H}_5\text{OPS}(\text{OC}_6\text{H}_4\text{NO}_2)_2$	126-127	90
Ethyl-3,3'-dinitrodiphenylthiophosphate $\text{C}_2\text{H}_5\text{OPS}(\text{OC}_6\text{H}_3\text{NO}_2)_2$	81-82	90
Propyl-4,4'-dinitrodiphenylthiophosphate $\text{C}_3\text{H}_7\text{OPS}(\text{OC}_6\text{H}_4\text{NO}_2)_2$	92-93	65
Isopropyl-4,4'-dinitrodiphenylthiophosphate $(\text{C}_3\text{H}_7)_2\text{CHOPS}(\text{OC}_6\text{H}_4\text{NO}_2)_2$	96-97	51
Butyl-4,4'-dinitrodiphenylthiophosphate $\text{C}_4\text{H}_9\text{OPS}(\text{OC}_6\text{H}_4\text{NO}_2)_2$	57-58	80
4,4',4''-trinitrotriphenylthiophosphate $(\text{O}_2\text{NC}_6\text{H}_4\text{O})_3\text{PS}$	175-176	50

TABLE 2

Name, Formula	d_4^{20}	n_d^{25}	Yield (in %)
Dimethyl-4-nitrophenylthiophosphate $(\text{CH}_3\text{O})_2\text{PSOC}_6\text{H}_4\text{NO}_2$	1.3518	1.5600	80
Diethyl-2-nitrophenylthiophosphate $(\text{C}_2\text{H}_5\text{O})_2\text{PSOC}_6\text{H}_4\text{NO}_2$	1.2551	1.5255	50
Diethyl-3-nitrophenylthiophosphate $(\text{C}_2\text{H}_5\text{O})_2\text{PSOC}_6\text{H}_3\text{NO}_2$	1.2801	1.5262	79
Diethyl-4-nitrophenylthiophosphate $(\text{C}_2\text{H}_5\text{O})_2\text{PSOC}_6\text{H}_4\text{NO}_2$	1.2704	1.5374	80
Dipropyl-4-nitrophenylthiophosphate $(\text{C}_3\text{H}_7\text{O})_2\text{PSOC}_6\text{H}_4\text{NO}_2$	1.2123	1.5327	65
Diisopropyl-4-nitrophenylthiophosphate $[(\text{CH}_3)_2\text{CH}]_2\text{PSOC}_6\text{H}_4\text{NO}_2$	1.2101	1.5378	60
Dibutyl-4-nitrophenylthiophosphate $(\text{C}_4\text{H}_9\text{O})_2\text{PSOC}_6\text{H}_4\text{NO}_2$	1.1640	1.5311	27

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TABLE 3

Min Amt (in %) of the Compound
Contained in a Powder Prep Re-
quired to Produce 100% Ex-
termination

<u>Name</u>	<u>Aphis fabae Scop.</u>	<u>Calandra granaria L.</u>
Methyl-4,4'-dinitrodiphenylthiophosphate	1.25-2.5	-
Ethyl-3,3'-dinitrodiphenylthiophosphate	-	5
Ethyl-4,4'-dinitrodiphenylthiophosphate	0.1-0.25	0.1-0.25
Propyl-4,4'-dinitrodiphenylthiophosphate	-	5
Isopropyl-4,4'-dinitrodiphenylthiophosphate	-	5
Butyl-4,4'-dinitrodiphenylthiophosphate	-	5
Dimethyl-4-nitrophenylthiophosphate	0.3-0.6	-
Diethyl-2-nitrophenylthiophosphate	0.15-0.3	-
Diethyl-3-nitrophenylthiophosphate	-	5
Diethyl-4-nitrophenylthiophosphate	0.012-0.025	0.012-0.025
Dipropyl-4-nitrophenylthiophosphate	-	5
Diisopropyl-4-nitrophenylthiophosphate	-	5
Dibutyl-4-nitrophenylthiophosphate	-	5
Trimethylthiophosphate	1.25-2.5	-
Triethylthiophosphate	1-2.5	0.5-1
4,4',4''-trinitrotriphenylthiophosphate	>10	>10
DDT	>5.5	>5.5
GKhtsG	3.5-7	3.5-7
Anabasine sulfate (on talcum)	1-2.5	5

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